Nazdar 2300 UV / UV-LED Screen Ink Series

The 2300 Series UV / UV-LED Screen Ink is tailored to meet the needs of the container market for printing on various glass and plastic bottles used in the packaging of cosmetics, household chemicals, and other similar applications. 2300 Series is formulated to cure using either a 395 nanometers LED curing lamp-system or traditional UV mercury vapor curing system. The ink has been formulated to meet the processing requirements of the container printing industry, such as adhesion to commonly used plastics, opacity, resistance to commonly used chemicals, and speed of cure.

Substrates

Polyethylene terephthalate (PETE)
Treated polyethylene containers (PE)
Glass
Ceramic

Substrate Material(s) listed below may be Limited in Adhesion *(testing highly recommended for each print run)*
Treated polypropylene (PP)
High Density Polyethylene sheeting (HDPE)
Treated low density polyethylene (LDPE)

Notes & Cautions

The surface tension for polyethylene and polypropylene substrates should be at or above 44 dynes/cm.

Substrate recommendations are based on commonly available materials intended for the ink's specific market when the inks are processed according to this technical data. While technical information and advice on the use of this product is provided in good faith, the User bears sole responsibility for selecting the appropriate product for their end-use requirements. Reference the 'Quality Statement' at the end of this document.

Mesh

355-420 tpi (140-165 tpcm) monofilament polyester mesh with a mesh opening of 22-38 um for most applications.

305 tpi (120 tpcm) monofilament polyester mesh for NSC231 Frost Clear MD and other special effect pigments.

305-355 tpi (120-140 tpcm) monofilament polyester mesh with a mesh opening of 50 um or more can be used for specialty applications (i.e., pearlescents, aluminums, etc).

Coarser mesh counts and/or twill weave result in heavier ink deposit requiring additional cure output.

Stencil

Use direct emulsions and capillary films which are solvent resistant and UV compatible.

Squeegee

70-90 durometer polyurethane squeegee.

Coverage

Depending upon ink deposit, the estimated coverage per gallon: 3,200 – 4,200 square feet (295 - 390 square meters)
Reference www.nazdar.com/en-us/ColorStar for examples of coverage calculations.

Screen Printing

Standard items are formulated to be press ready. Thoroughly mix the ink prior to printing. Improper mixing can lead to inconsistent color and ink performance.

Maintain ink temperature at 65°-90°F (18°-32°C) for optimum print and cure performance. Lower temperatures increase the ink viscosity, impairing flow and increasing film thickness. Elevated temperatures lower the ink viscosity, reducing print definition and film thickness.

Pretest to determine optimum printing parameters for a particular set of ink, substrate, screen, press, and curing variables/conditions.

The ink can be affected by stray UV light. Be aware of skylights, windows and overhead lights curing the ink in the screen; light

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filters are recommended. Leaving a container uncovered may result in the ink's surface forming a "skin", caused by reaction with ambient lighting. Keep containers covered.

Nazdar does not recommend inter-mixing this ink series with other inks or series.

Pad Printing
When pad printing with a UV ink on a 3D image, care must be taken to assure the correct amount of UV light output reaches the entire ink surface. Cure units that rotate the printed part in front of the cure lamp are the best solution for UV pad printing. These UV inks can be pad printed. The use of thinners may be required to achieve the correct transfer. Please follow the printing and curing guidelines.

Use a silicone pad with good chemical resistance for printing. Clean equipment using the chemicals listed in the Cleanup section.

Cure Parameters
These guidelines are intended only as a starting point for determining cure parameters, which must be determined under actual production conditions. "Undercuring" the ink may result in poor adhesion, lower block resistance, reduced durability, and higher residual odor. "Overcuring" the ink may reduce the flexibility of the printed part and adhesion of subsequent ink layers.

Mercury Vapor UV Curing: this series has been optimized for 395nm LED curing; however, most colors cure when exposed to a single medium pressure mercury vapor lamp emitting output millijoules (mJ) and milliwatts (mW) of:

120+ mJ/cm² @ 600+ mW/cm² for most colors

These guidelines are representative of measurements taken using an EIT® UVICURE® Plus radiometer measuring the UVA bandwidth (320-390 nm). To obtain accurate mW readings with the UVICURE® Plus, reduce the belt speed to less than 40 ft/min.

UV-LED Curing: cures when exposed to a Phoseon FireLine 4+ watt, 385-405 nm lamp at a distance of .15 to .25 inches (4 to 6 mm). Lamps of similar performance are expected to provide the necessary output to effectively cure the ink.

Processing
Note: 2378 High Intensity White, 2376 HB High Intensity White, and 2398 Bright White may exhibit poor scratch resistance at full cure with the use of mercury vapor curing and require an additive to increase adhesion.

Adhesion Testing
When recommended UV energy output levels are achieved, checking the degree of cure on a **cooled down** print is imperative:
- Touch of ink surface – the ink surface should be smooth.
- Thumb twist – the ink surface should not mar or smudge.
- Scratch surface – the ink surface should resist scratching.
- Cross hatch tape test – per the ASTM D-3359 method, use a cross hatch tool or a sharp knife to cut through ink film only; then apply 3M #600 clear tape on cut area, rub down, and rip off at a 180 degree angle. Ink should only come off in actual cut areas.

Cleanup
For screen cleaning, similar products to those listed below may be used.

Screen Wash (Prior to Reclaim): Use IMS201 Premium Graphic Screen Wash or IMS203 Economy Graphic Screen Wash
Press Wash (On Press): Use IMS301 Premium Graphic Press Wash

Ink Modifications

Clears / Varnishes
Mixing Clear: use to reduce the density of colors.
Overprint Clear: use to provide added surface protection and increase durability.

Additives
The market specific performance properties of this ink series / ink item should be acceptable for most applications without the need for additives. When required, any additives should be thoroughly mixed before each use. Prior to production, test any additive adjustment to the ink. Inks containing additives should not be mixed with other inks.

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Prior to production, test any additive adjustment to the ink. Inks containing additives should not be mixed with other inks.

Example for additives: Ink at 100g with 8% of an additive is calculated as: 100g ink + 8g additive = 108g total

Reducer / Thinner
Use the following item(s) to reduce the viscosity of these inks. Over reduction can reduce print definition, film thickness and adversely affect cure.
RE310 UV Reducer: add up to 10%

Thickener / Increase Viscosity
Use SIPI414 Thickening Powder to increase viscosity. Add powder starting at ½%. The addition of SIPI414 may affect printability and lower the gloss of the ink film. The addition of SIPI414 requires power mixing of the ink.

UV Hardener
Use CARE69 UV Hardener to improve chemical resistance and to minimize scuffing especially on prints immediately out of the curing unit. CARE69 will not affect the shelf stability and viscosity of the ink mixture. However, the addition of CARE69 will make the cured ink film less flexible and may affect ink to ink or inter-coat adhesion. Test thoroughly before any production as to suitability for the printing and end use requirements.
Add up to 5% for plastic containers.
Add up to 10% for glass containers.

Adhesion Promoter
Use only one type of adhesion promoter / catalyst in an ink at a time. Mixing multiple reactive additives together in an ink can cause undesirable results.
NB80 UV Adhesion Promoter: add up to: 5%. Improved adhesion will be demonstrated within 8-24 hours, with full crosslinking in 4-7 days. Ink mixed with NB80 UV Adhesion Promoter has a 4-8 hour pot life. NB80 is sensitive to humidity and moisture; clean the lid and container thoroughly after each use to prevent fusing of the container. Addition of NB80 may reduce the flexibility of the printed ink.

Use NB23 Catalyst to enhance adhesion and chemical resistance, especially on glass. Add up to 3%. Ink will be soft with initial curing, but will exhibit improved adhesion and chemical resistance within 24 hours. Most colors mixed with NB23 Catalyst have a 3-5 hour pot life; colors containing black have a 30-60 minute pot life.

Use CARE106 UV Catalyst / Charger to increase scuff resistance, chemical resistance and water resistance, especially for plastic applications. Add up to 10%. Improved adhesion and water resistance will be demonstrated within 24 hours. Ink mixed with CARE106 has an 8-12 hour pot life with performance properties slowly declining with time.

Use NB26 Glass Catalyst to enhance the adhesion to Glass. 5% addition of NB26 is sufficient in most cases, however, 10% can be added. Do not exceed 10%. Full adhesion and water resistance will be demonstrated within 24 hours. Inks mixed with NB26 will have a 4-6 hour pot life. NB26 is sensitive to humidity and moisture; clean the lid and container thoroughly after each use to prevent fusing of the container.

Use NB27 Glass Catalyst to enhance the adhesion to Glass. 5% addition of NB27 is sufficient in most cases, however, 10% can be added. Do not exceed 10%. Full adhesion and water resistance will be demonstrated after 24 hours. Inks mixed with NB27 will have a 8-10 hour pot life. NB27 is sensitive to humidity and moisture; clean the lid and container thoroughly after each use to prevent fusing of the container.

General Information
Handling
Refer to the SDS for recommendations on handling.
Wear gloves and barrier cream to prevent direct skin contact. Safety glasses are suggested in areas where ink may be splashed. If product does come in contact with skin, wipe ink off with a clean, dry cloth (do not use solvent or reducer). Wash the affected area with soap and water.

Consult the applicable Safety Data Sheet (SDS / MSDS) for further instructions and warnings.

This ink series is a one-part, 100% solids UV-curable screen printing ink and does not contain N-vinyl-2-pyrrolidone (trade name V-Pyrol®).

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For assistance on a wide range of important regulatory issues, consult the following Regulatory Compliance Department link at http://www.nazdar.com or contact Nazdar Ink Technologies - World Headquarters (see contact listing at the end of this document).

Weathering / Outdoor Durability
This Series was formulated for printing on containers for packaging applications. These inks are not recommended for long-term outdoor exposure. If the inks are to be used in any type of outdoor application, the printer and/or the end user has the responsibility to test the inks and substrate to the end use specifications.

Storage / Shelf Life
Store closed containers at temperatures between 65°-78°F (18°-25°C). Storing products outside of these recommendations may shorten their shelf life.

Ink taken from the press should not be returned to the original container; store separately to avoid contaminating unused ink. Store closed containers at temperatures between 65°-78°F (18°-25°C). Storing products outside of these recommendations may shorten their shelf life.

Standard items supplied in 1-gallon (4-5 kg) containers or smaller. Useable for a period of at least **24 months** from the date of manufacture.

Shelf life above applies to the standard ink items listed on this TDS. To obtain the shelf life for special inks and additives, contact Nazdar Customer Service or Nazdar Technical Service. See contact listing at the end of this document.

Standard Color Range
Based on information from our raw material suppliers, these ink products are formulated to contain less than 0.06% lead. If exact heavy metal content is required, independent lab analysis is recommended.

Halftone Colors
Halftone Extender Base is used to reduce the density of any of the halftone colors.

Standard Halftone Colors are formulated with hues and densities common to the graphic industry.

Standard Printing Colors
Standard Printing Colors: have excellent opacity and flow characteristics. These colors are intended to work as supplied.

High Opacity Colors have been formulated to achieve hard to match red, orange and yellow colors over dark substrates. Opaque colors can be used as is or mixed with other colors to achieve opaque color matches.

Pantone Base Colors
Pantone Matching System Base Colors are used to simulate the Pantone® Formulation Guide when printed on a white substrate. These inks are press ready, can be used in matches to achieve Pantone color simulations, or let down with mixing clear.

360 Series Colors: These colors are formulated to have no white or opaque pigments. This allows the colors to be more vibrant and allows for a better match of intense and darker colors.
ColorStar® Color Management System software uses Pantone Matching System Base Colors to match Pantone colors. Blend formulations are also available at www.nazdar.com using ColorStar On-Line.

Series Specific
Frost Textured Effect Clear
NSC231 UV / UV-LED Frost Clear MD Screen Ink has been formulated to provide a frosted look and medium textured feel. Finer and coarser textures are be available upon request.
- Use 23358 Tinting White, 2378 High Intensity White, or 2376 HB High Intensity White to increase the opacity of the NSC231. Other 2300 series colors can be used to tint the NSC231. Large additions of tinting ink decrease the textured feel of the frost effect and can adversely affect curing.
- Use 2327 Overprint Clear to increase the clarity of the frosted effect. This decreases the textured feel of the ink.

Special Effect Pigments
When inks are to be printed with a special effect color, all ink layers must be evaluated for intercoat adhesion before proceeding

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with the production run. To maximize intercoat adhesion, specialty colors should be printed as late as possible in the print sequence.
Pigments may settle in the container; prior to printing, thoroughly mix the ink.
The following special effect pigments may be added to the ink. Contact Nazdar for the item number(s) and availability of special effect products or they can be found at www.nazdar.com.

Metallic Silver (aluminum), add up to: 8%
Metallic Gold (bronze), add up to: 15%
Chemical reactions in metallic inks may result in viscosity, color and printability changes over time; due to this, mix only enough metallic ink to be used the same day.

Pearlescent / Interference, add up to: 20%
Multi-Chromatic, add up to: 10%
Phosphorescent , add up to: 30%

Fluorescents, add up to: 30%
Fluorescent colors fade quickly with exposure to ultraviolet light. This includes outdoor exposure as well as UV reactor exposure.

Color Card Materials
The following is a list of available literature representing this ink series.
- UV Color Card (CARDUV): shows the Standard Printing Colors, Pantone Matching System Base Colors, and Halftone Colors

Packaging / Availability
Contact your Nazdar distributor for product availability and offering.

Item Type	Item Number	Item (or Color) Description
Standard Colors	2310	Primrose Yellow
Standard Colors	2312	Medium Yellow
Standard Colors	2319	Fire Red
Clears / Varnishes	2326	Mixing Clear
Clears / Varnishes	2327	Overprint Clear
Standard Colors	2376	Heavy Body (HB) High Intensity White
Standard Colors	2377	Heavy Body (HB) High Intensity Black
Standard Colors	2378	High Intensity White
Standard Colors	2379	High Intensity Black
High Opacity Colors	23700	Opaque Orange
High Opacity Colors	23701	Opaque Yellow
High Opacity Colors	23703	Opaque Red
Mixing Colors	23358	Tinting White
Mixing Colors	23359	Tinting Black
Mixing Colors	23360	Orange
Mixing Colors	23361	Yellow
Mixing Colors	23362	Warm Red
Mixing Colors	23363	Rubine Red
Mixing Colors	23364	Rhodamine Red
Mixing Colors	23365	Purple
Mixing Colors	23366	Violet
Mixing Colors	23367	Reflex Blue
Mixing Colors	23368	Process Blue
Mixing Colors	23369	Green
Halftone Colors	2390	Halftone Extender Base
Halftone Colors	2391	Halftone Cyan
Halftone Colors	2392	Halftone Magenta
Halftone Colors	2393	Halftone Yellow
Halftone Colors	2394	Halftone Black

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Other Colors	NSC231	Frost Textured Clear
Additives	Care69	UV Hardener
Additives	Care106	UV Catalyst / Charger
Additives	NB23	Catalyst
Additives	NB26	Glass Catalyst
Additives	NB27	Glass Catalyst
Additives	NB80	UV Adhesion Promoter
Additives	SIPI414	Thickener
Cleaners	IMS203	Economy Graphic Screen Wash
Cleaners	IMS301	Premium Graphic Press Wash
Additives	RE310	UV Reducer

Nazdar Quality Statement

Nazdar® stands behind the quality of this product. Nazdar® cannot, however, guarantee the finished results because Nazdar® exercises no control over individual operating conditions and production procedures. While technical information and advice on the use of this product is provided in good faith, the User bears sole responsibility for selecting the appropriate product for their end-use requirements. Users are also responsible for testing to determine that our product will perform as expected during the printed item's entire life-cycle from printing, post-print processing, and shipment to end-use. This product has been specially formulated for screen printing, and it has not been tested for application by any other method. Any liability associated with the use of this product is limited to the value of the product purchased from Nazdar®.

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